

REMARKS

Reconsideration of this application in light of the present amendment and remarks is respectfully requested.

Claims 1-6 have been rejected.

Claims 5-6 have been canceled, without prejudice.

Claim 7 has been added.

Claims 1 and 3 have been amended.

Claims 1-4 and 7 are pending in this application.

Claims 1-2 and 4-6 have been rejected under 35 U.S.C. §102(b) as being anticipated by Hottinen et al. (WO 01/69814). This rejection is respectfully traversed.

Claims 5 and 6 have been canceled.

Independent claim 1 has been amended to clarify that the receiver comprises an antenna array having a plurality of antenna elements and that the complex weighting matrices are functions of the respective transmission channels of the data streams between each of the plurality of N transmit antenna elements and each of the plurality of M receive antenna elements. Support for the amendment may be found in the specification as a whole including for example page 2 lines 29 to 31, page 4 line 21, and page 5 line 1. Indeed it is respectfully submitted that original claim 1 specifically stated that M is greater than the number of transmit antenna elements divided by the minimum number of transmit antennas in each subgroup (i.e. N/N_d). It is noted that N/N_d is inherently higher than one and thus that M inherently is at least two.

Thus, the current invention is exclusively directed to a Multi-Transmit-Multi-Receive (MTMR) diversity scheme (ref. e.g. page 3 lines 27-29 and page 2 lines 29-31). MTMR is a new technology which is currently being researched and which is considered for introduction to existing communication system. MTMR inherently relies on a plurality of both receive and transmit antennas and use cross correlation of information between signals received at a plurality of receive antennas to extract the data received from a plurality of transmit antennas. Hence, it is an essential feature and requirement of MTMR that a plurality of transmit and receive antenna elements are employed.

Advantageously, the present invention provides for an improved MTMR system and it is a particular object of the invention that an increase of spectral efficiency is achieved (see page 3 lines 21 to 25 and page 9 line 7). The system achieves this by using an MTMR arrangement wherein different signals are transmitted from different antenna sub-groups with signals of each antenna element being weighted in response to respective transmission channels of the data

streams between each of the plurality of N transmit antenna elements and each of the plurality of M receive antenna elements. Thus, the weights are determined, not just in response to different characteristics of different transmit antenna elements, but also in response to different characteristics of different receive elements (ref. e.g. page 7 line 24 to page 9 line 5).

In contrast, it is respectfully submitted that Hottinen et al do not even consider MTMR systems. Rather it is respectfully submitted that Hottinen et al merely describe variations of conventional transmit diversity schemes wherein a signal may be transmitted with diversity for reception by a simple standard *single* antenna receiver.

In particular, Hottinen et al merely describe a system of combining a standard closed loop transmit diversity technique (known as TxAA) with a standard open loop transmit diversity technique (known as STTD). However, the system is clearly not an MTMR system but is a pure transmit diversity scheme wherein a single receive antenna is used (ref. FIG. 3 and the whole of the description). Thus, it is respectfully submitted that Hottinen et al are concerned only with a traditional transmit diversity system which has substantially different technical characteristics, performance and problems than an MTMR system. For example, any weight calculation is performed on the basis of transmit diversity differences only, and there is no disclosure or suggestion that transmission weights of the transmitter may be adjusted in response to a diversity arrangement of a remote receiver.

Moreover, Hottinen et al do not include any suggestion or hint that a plurality of receive antennas could be used or how the system could be (and must be) modified to work in such an MTMR arrangement. Accordingly, it is respectfully submitted that Hottinen et al clearly fail to disclose a system in accordance with the independent claims and in particular fails to disclose a plurality of receive antennas and a determination of weights for different data streams transmitted from different antenna element subgroups being determined as a function of transmission channels to a plurality of receive antennas.

An objective problem solved by the present invention is that of how to provide improved spectral efficiency in an MTMR system. Hottinen et al do not provide a solution to this problem. It is also noted that in fact the system of Hottinen et al do not provide any improvement in spectral efficiency but maintains the same data rate in the same channel bandwidth (the system employs a transmit diversity block code scheme where redundant symbols are transmitted thus resulting in an unchanged information data rate). Thus, not only are Hottinen et al concerned with a technically substantially different communication system, they are also dealing with a different object than the present invention and cannot provide the advantages of the present invention.

Thus, it is respectfully submitted that claim 1 herewith filed is patentably distinct and non-obvious over Hottinen et al, and is therefore allowable.

Claims 5 and 6 have been deleted and instead a new apparatus claim 7 has been added including all of the recitations of amended claim 1. Therefore, claim 7 is deemed allowable as well for the same reasons.

Claims 2 and 4 are dependent on amended claim 1, hereby incorporated by reference, and are deemed allowable as well for the same reasons.

Accordingly, applicant respectfully requests that this rejection be withdrawn.

Claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Hottinen et al. as applied to claim 1 above, and further in view of Raleigh (US 6377631). This rejection is respectfully traversed.

Claim 3 is dependent on amended claim 1, hereby incorporated by reference, and is therefore deemed allowable as well for the same reasons.

Accordingly, it is respectfully submitted that this rejection has been overcome.

The other references of record have been reviewed and applicant's invention is deemed patentably distinct and nonobvious over each taken alone or in combination.

For the foregoing reasons, applicants respectfully request that the above rejections be withdrawn.

Inasmuch as this amendment distinguishes all of the applicants' claims over the prior art references, for the many reasons indicated above, passing of this case is now believed to be in order. A Notice of Allowance is earnestly solicited.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

In the event that the Examiner deems the present application non-allowable, it is requested that the Examiner telephone the Applicants' attorney at the number indicated below so that the prosecution of the present case may be advanced by the clarification of any continuing rejection or through an Examiner's amendment.

Authorization is hereby given to charge any fees necessitated by actions taken herein to Deposit Account 50-2117.

Respectfully submitted,
Buljore et al.

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